



DOING YOUR FAIR SHARE FOR THE CLIMATE?

THE POWER AND RESPONSIBILITY OF INDIVIDUALS, BUSINESSES AND THE STATE IN THE FIGHT AGAINST CLIMATE CHANGE A FRENCH CASE STUDY

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Even if environmentalism has undeniably increased in people's minds in recent years, France is still far from managing the acceleration necessary to achieve the objectives set for the reduction in greenhouse gas emissions.

Whose fault is it? Some say it is the consumers that need to adopt a more ecologically responsible behavior, with common "small actions", such as recycling. Others say the government and companies should be the ones to act sharply, because these big players have failed to deliver the necessary results so far.

In fact, the battle can only be won if it is fought on all fronts. To know who can act where and how to manage the priorities, it is vital to have a good understanding of the orders of magnitude.

What impact can we expect from these "small daily actions"? What impact could radical change in individual behavior have on a French citizen's average carbon footprint? What role should companies and the State play in the transition?

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EXECUTIVE SUMMARY

FACING THE CLIMATE EMERGENCY

Even if general awareness about climate topics has undeniably increased in recent years, and we sometimes even hear that “environmentalism has won the cultural battle”, the translation from words to action does not always make it to the top of the agenda.

One of the reasons of this delay in getting this transition started is **that people generally have a certain tendency to believe that action needs to take place “elsewhere”**, all whilst claiming that they are allegedly taking enough action in their own way.

Various players keep passing the ball back and forth to each other; public authorities, companies, the financial world, citizens and non-profit organizations: everyone is blaming the slow progress on the others' responsibilities and failures.

THE REAL IMPACT OF INDIVIDUAL ACTIONS ON FRENCH CITIZENS' CARBON FOOTPRINT

Faced with a need to take fast and effective action, **the media tend to focus mainly on the consumers' responsibilities and ecological citizenship**. First and foremost, individuals and households should adopt environmentally-friendly practices as soon as possible, because they allegedly have the power to make a real difference when it comes to the climate objectives.

For the average French citizen, the likely impact of changing individual behavior could stagnate at a 5 to 10% drop in the carbon footprint.

A French citizen's average carbon footprint, which amounted to 10.8 tonnes of CO₂ in 2017, needs to decrease by around 80% by 2050 to reduce it to 2 tonnes of CO₂ a year, in accordance with the Paris Agreement. **To what extent should individual action contribute to this objective?**

We have established a **list of a dozen actions** that individuals can take by their own initiative, **by accumulating “small daily actions”** (buying a reusable water bottle, using LED light bulbs in their housing etc.) **and behavioral changes that are slightly more ambitious** (eating vegetarian, giving up flying, systematic car sharing etc.). These actions are all achievable **without making a large investment**.

We then had a look at what you could expect in terms of decreasing the carbon footprint if French citizens took daily and systematic action together. **It was found that it could decrease by about -25%.**

This hypothesis helped highlight **two important results**:

- First, **the impact of individual action isn't negligible** - as long as it is not limited to symbolic or marginal actions. Among the many individual actions, there is one that has the biggest impact; moving away from a meat-based diet to a vegetarian diet alone can lead to a 10% decrease in an individual's total carbon footprint.
- However, **it must be noted that even an “ambitious” effort in behavior cannot achieve a decrease sufficient to meet the 2°C objective** from the Paris Agreement, an agreement that calls for the disappearance of 80% of the current emissions (in carbon footprint).

Furthermore, even if we consider a situation where we urge citizens to take action, it is likely that all French citizens will be far from implementing these measures. Thus, the best that we could expect from voluntary individual lifestyle changes would be a decrease of approximately 5% -10% of the average personal carbon footprint.

WE ARE ALL CONSTRAINED BY THE SOCIO-TECHNICAL SYSTEM

Our calculations show that **individual and household involvement in reducing the carbon footprint in lifestyles is crucial, yet also insufficient** to reach the reduction targets and to aim for carbon neutrality in 2050.

In two centuries (since the industrial revolution), **we have developed a social and technical environment built on the promise of abundant and cheap fossil fuels**, without enough negative constraints to force us to deliberately set ourselves a limit. It is machines that emit CO₂, not humans; in order to reduce economies' carbon footprints, individual action is definitely part of the answer, but it is not enough to achieve the necessary reduction. Likewise, technical efficiency and improvement are essential, but not enough.

In order to win this battle, **we need to look beyond the individual level and reach a new level of collective action**. Alongside the efforts made in our private lives, which should already be taking place, the system should also support its citizens or employees by triggering a change which is much more radical and profound than what is happening at the moment.

All individuals are limited by the “socio-technical system”, i.e. the social and technical environment on which they depend.

MATCH AN INDIVIDUAL RESPONSIBILITY LOGIC WITH A COLLECTIVE ADVOCACY LOGIC

In order to reform the system and reduce the carbon footprint of equipment and services on which we all depend, **investments need to play a crucial role**.

Private investments in housing renovation (thermal renovation, changing boilers etc.) and low-carbon vehicles (electric or fuel efficient vehicles or possibly even those which run on biogas) play a huge role in the transition. These investments need to be kicked-off and promoted by the public authorities, whose job it is to make sure there are enough incentives and subsidies.

Overall, the combination of 'realistic' behavioral changes in terms of individual actions and investments at an individual level each equate to approximately a 10% reduction, leading to approximately a 20% reduction of an individuals' carbon footprint. This is a quarter of what needs to be achieved in order to meet the 2°C objective.

The remaining effort consists of investments and collective rules for which the State and companies are responsible.

Companies will not be able to do anything at the right scale without starting to measure - as meticulously as their financial accounts - their dependence on fossil fuels. It is the first step towards drastically reducing their carbon footprint in the best conditions. This will help them to reflect on the possibility of changing: their industrial processes, freight of goods, energy supply, product design, as well as choice of investments and geographical locations.

Remember that, in a company, wide-scale action only takes place if decided and driven by the top executives as well as being integrated at the heart of the strategy.

It is the State's responsibility to assume its role as a governor, investor and "catalyst" at all levels. It can - and should – set an example in its investments, in the renovation of its own public buildings and initiate the carbon footprint reduction of their services (mainly health, education, defence, which represents 10% of the country's carbon footprint).

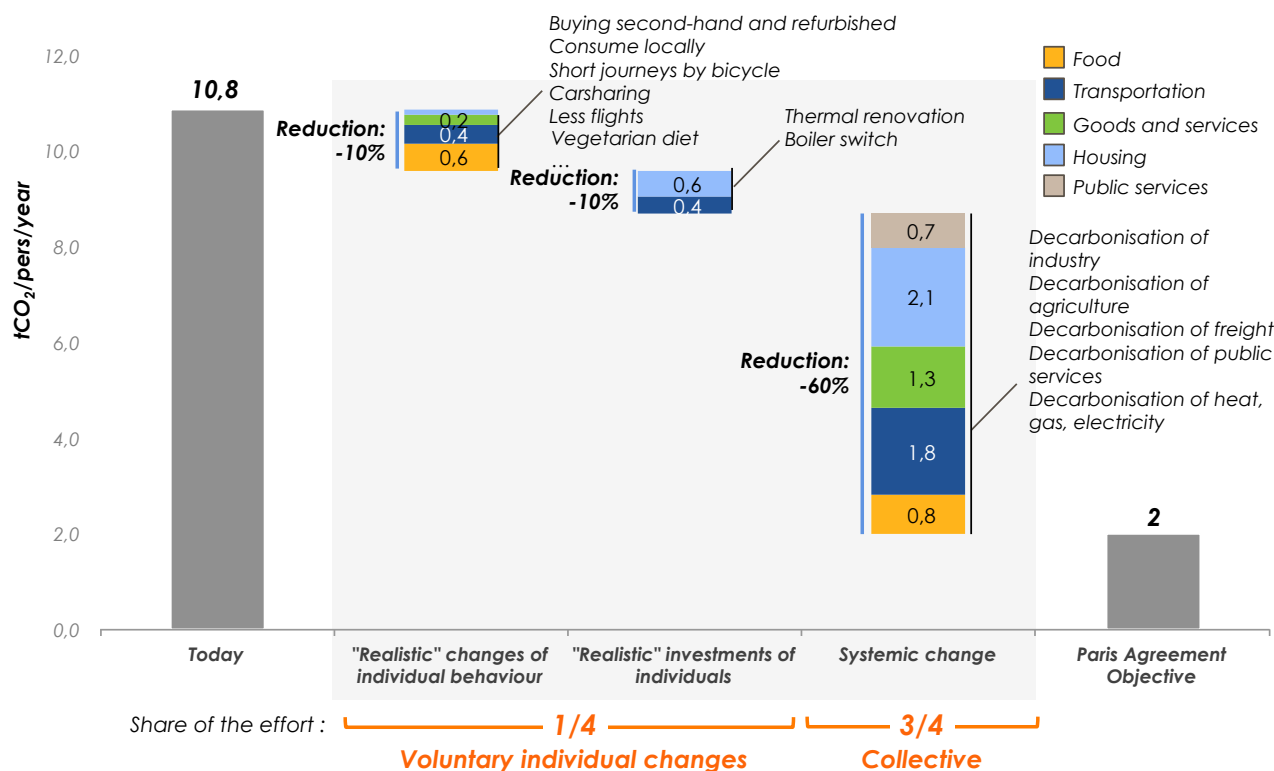
The State is the only one that can declare the rules which make it possible to redirect investments into carbon reduction sectors at the expense of brown assets; as well as being able to implement financial incentives and adequate regulations, educate employees about climate issues, and, if necessary, determine the commercial agreements regarding the climate. **It is only the State who can negotiate with the European institution**, who retains regulatory jurisdiction on many major topics regarding the climate.

Furthermore, the State needs to accept the responsibility of weighing up the benefits of short-term growth and the disadvantages of growth "a little later on".

These various means of action should be used to initiate a radical transition. Here we can give an insight into the general outline of this transition, but these actions are by no means exhaustive: the development of low-carbon energies according to their contribution to achieving national objectives and their cost per tonne of CO₂ avoided; putting an end to the use of carbon and fossil fuels in energy production; big renovation projects for residential and tertiary sector buildings; carbon intensity reduction of mobility and freight; deep reform of the agricultural system; carbon reduction of French industry processes; and the development of natural and technological carbon sinks etc.

It is therefore futile, and even dangerously counter-productive, to pretend that we can resolve climate issues by placing the full responsibility on individuals alone. Above all, it is a systemic problem; thus establishing a viable and credible solution goes hand in hand with strong collective action, which will require everyone's action, proportionate to each individual's capacity to contribute.

Reducing the French average carbon footprint With individuals' « realistic » voluntary commitment*



* The "realist" vision believes that only a part of the potential individual efforts will actually be achieved, depending on the desire of French households to change on a national scale. It is therefore more modest than the "ambitious" vision, where all households take all action possible (a decrease of -25% in this case).

METHODOLOGY

TWO IMPORTANT NOTES ABOUT OUR METHODOLOGY

1. The only factor taken into account in this study is the **“climate” factor**, in other words, the human impact on climate change, measured by the amount of greenhouse gases emitted yearly. This impact is expressed in tonnes of CO₂ equivalent (tCO₂e); the GHG¹ emissions beyond carbon dioxide are converted into the tCO₂ equivalent according to the equivalent GWP100 metric.

Other crucial environmental impacts (on biodiversity, water, waste production or ocean acidification...) fall under different calculations.

2. The study analyses **the carbon footprint of the “average French citizen”**. It is equal to the country's carbon footprint² divided by the number of inhabitants. **Obviously this average French citizen does not exist**: this is simply an imaginary concept which makes it possible to manipulate easy-to-use data. A more refined study could split up the different levels of GHG emissions for individuals from each socio-economic class and thus provides initiatives for action available to each one.

For example in mobility: the urban SPC (socio-professional category) uses a fair amount of public transport and flights; whereas, the middle-class who live in a rural or suburban areas make a lot of journeys in internal combustion engine cars, etc.

Nevertheless, we would like to stress that this current exercise with an average approach remains interesting because **it provides a relevant and easily understandable insight into the order of magnitude of this issue**.

All the graphs are from Carbone 4 internal modelling.

¹ GHG: Greenhouse gases.

² The national carbon footprint is equal to France's regional emissions + imports + exports.

THE REAL IMPACT OF INDIVIDUAL'S ECO-FRIENDLY PRACTICES

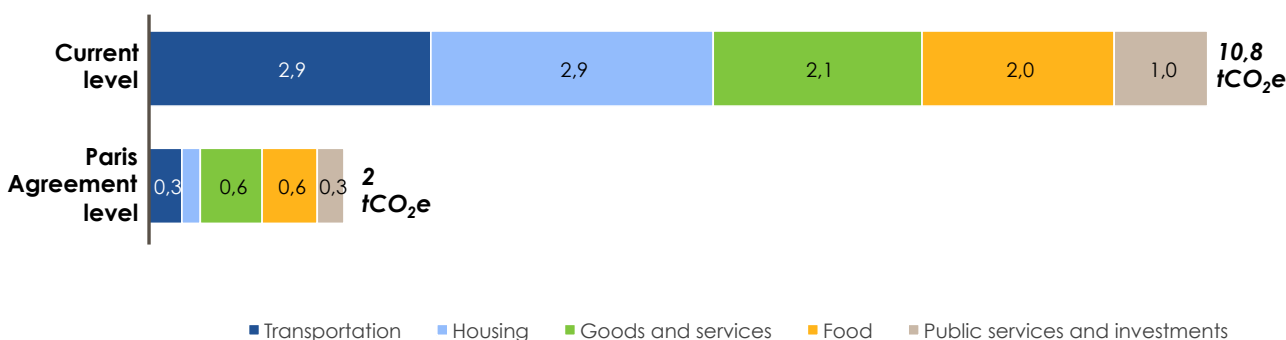
AN AVERAGE CALCULATION BASED ON NATIONAL EMISSIONS

As individual consumers of housing, transportation, food, goods and services, we all have a **"personal carbon footprint"** expressed in tonnes of CO₂ equivalent (CO₂-eq)¹ per year which reflects our own yearly personal impact on the climate.

France calculates **"the average French citizen's carbon footprint"** every year, in other words France's carbon footprint divided by the number of inhabitants.

In 2017, this number reached 10.8 tonnes of CO₂ per year, per person².

Average carbon footprint of a French person tCO₂



A FOOTPRINT SIX TIMES TOO BIG

The ultimate objective in terms of the climate consists of not exceeding a global warming of +2°C compared with pre-industrial times. **The drastic, radical reduction of GHG emission levels compatible with this ambition means that the average French citizen would need to reduce its footprint from approximately 11 tCO₂eq to around 2 tCO₂eq per person and per year, by 2050. However, even if the objective that needs to be achieved is clear, the way in which this should be carried out still appears to be ambiguous.**

The topic of responsibility comes up time and time again. Various kinds of players keep passing the ball back and forth to each other: the public authorities, companies, the financial world, citizens and non-profit organizations: everyone is blaming slow progress on the others' responsibilities and failures.

The consumers' responsibility and commitment towards ecological citizenship has started to feature prominently among issues in everyday life. Thus, accordingly, it appears that individuals and households should adopt many ecological behaviors which would enable society to achieve the climate objectives.

¹ All non-CO₂ greenhouse gas emissions (methane, nitrous oxide) are translated into a CO₂ equivalent thanks to the GWP100 metric. ² Source: CGDD - Households & the Environment - Key Figures 2017

WHAT IS THE REAL IMPACT OF INDIVIDUAL « AMBITIOUS » INDIVIDUAL BEHAVIOR?

The exercise carried out in this first part aims to **estimate the maximum impact that individual actions can have, small and big** (besides actions requiring investment), on the average French citizen's carbon footprint.

The list of ecological actions was established based on the actions brought up frequently in everyday discussion. It is a mixture of “**small actions**” (turning the thermostat down, buying LED lights and buying a reusable bottle) and **more significant behavioral changes** (eating a vegetarian diet, giving up flying, only buying second-hand goods...). Each action is measured separately from the others. This study does not claim to publish an exhaustive list of actions: the reduction of food waste at an individual level, for example, or reducing the number of long-distance journeys done in a private car were not taken into consideration.

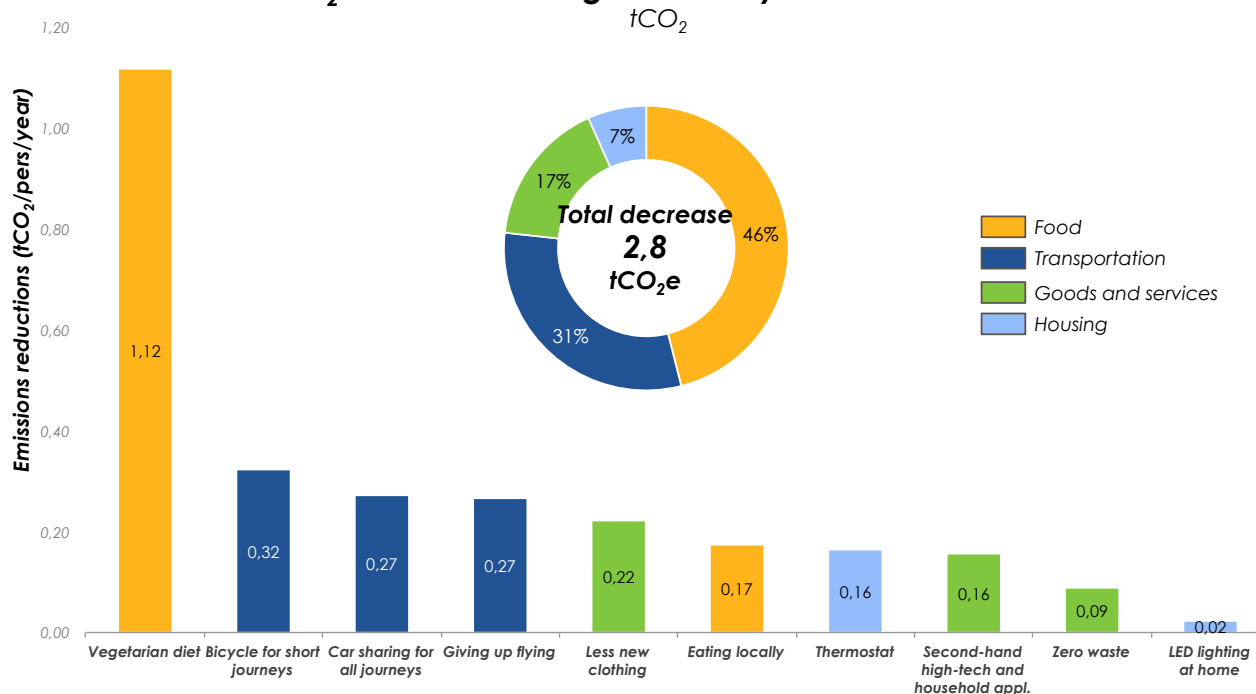
The hypotheses for each action are as follows:

Action	Hypothesis
Vegetarian diet	Removing meat and fish from one's diet ¹
Bicycles for short distances	Replacing the car with a bicycle for short journeys in urban areas ²
Car sharing for all journeys	Setting the occupancy rates for all short and long car journeys to 2.2 people/car ³
Giving up flying	Phasing out 100% of domestic and international flights ⁴
Less new clothes	Buying at least three times less new clothes ⁵
Eating local	Consuming food from short food supply chains (SFSC) only ⁶
Thermostat	Lowering the setpoint temperature of one's accommodation ⁷
Second-hand household and hi-tech appliances	Buying everything second-hand ⁸
Zero waste and reusable bottles	Eliminating emissions linked to packaging ⁹
LEDs in housing	Equipping housing with LED lighting ¹⁰

¹ Comparing emission factors from an “average meal” with a “vegetarian meal” by the *Base Carbone* - Carbon database from ADEME- the French Environment & Energy Management Agency. Side effects such as the impact of eliminating the use of livestock manure were not taken into account. ² Resetting passenger kilometres for short distances in urban areas to zero, from a publication by the National transport and travel survey (ENTD). ³ The increase in the vehicle occupation rate which automatically reduces the emissions per passenger kilometre. ⁴ Resetting emissions linked to international and national flights to zero (approx. 20 M tCO₂). ⁵ Dividing the spending on items “clothing/textile” of French citizens by three, conversion into CO₂ through the emission factors “textile and clothing” in the carbon database from the ADEME. ⁶ Eliminating 90% of emissions linked to food freight from Eco2climat. This action does not take into account the reduction linked to stopping the consumption of products that are not produced locally. ⁷ A 20% reduction in heating in all French residential buildings. ⁸ Buying second-hand household appliances and refurbished high-tech products: the emissions linked to the production phase are reset to zero. For household appliances, the emissions linked to transport are also reset to zero. We do not take into account the surplus of energy consumption generated by second hand household appliances compared with new household appliances when it comes to usage. ⁹ Resetting the quantity of household packaging used in France to zero (source: Ecoemballages). ¹⁰ Bringing about savings of 10 kWh net(t)/m²/year.

We are aware of the fact that this set of assumptions is unrealistic in two ways: not only because **all of these actions require a high level of involvement** (and therefore may make some of them less appealing), but also because we are assuming that they are **carried out simultaneously by all French citizens**.

CO₂ reductions brought about by individual action



INDIVIDUAL ACTIONS: TWO CONCLUSIONS

Two conclusions can be drawn from the quantification of individual efforts.

Firstly, **the impact of individual actions is far from negligible**. On the condition that, of course, individuals do not limit themselves to a few symbolic and marginal actions.

Among the individual actions which can have the biggest impact, one is **moving away from a meat-based diet towards a vegetarian diet**, and even better would be vegan. It makes it possible to limit the emissions issued from livestock (methane emissions by ruminants) and deforestation (releasing carbon as a result of the changes in the land use). **This alone represents a 10% decrease in the footprint, or 40% of the total decrease possible induced by the changes in behavior studies.** Next best are the actions related to modes of transport (car sharing, avoiding flights, 'soft' modes of transport), to the consumption of goods and services (buying clothes, second-hand household appliances and high-tech devices, and zero waste) and finally housing (thermostat, LED lighting).

Among the personal actions which can have the biggest impact, moving away from a meat-based diet towards a vegetarian diet comes out on top. This alone represents a 10% decrease in an individual's carbon footprint.

In this respect, ecological actions, if they are relevant, can have a real impact on the carbon footprint. Furthermore, they are necessary, in the strict sense of the word: nobody else can do them for us.

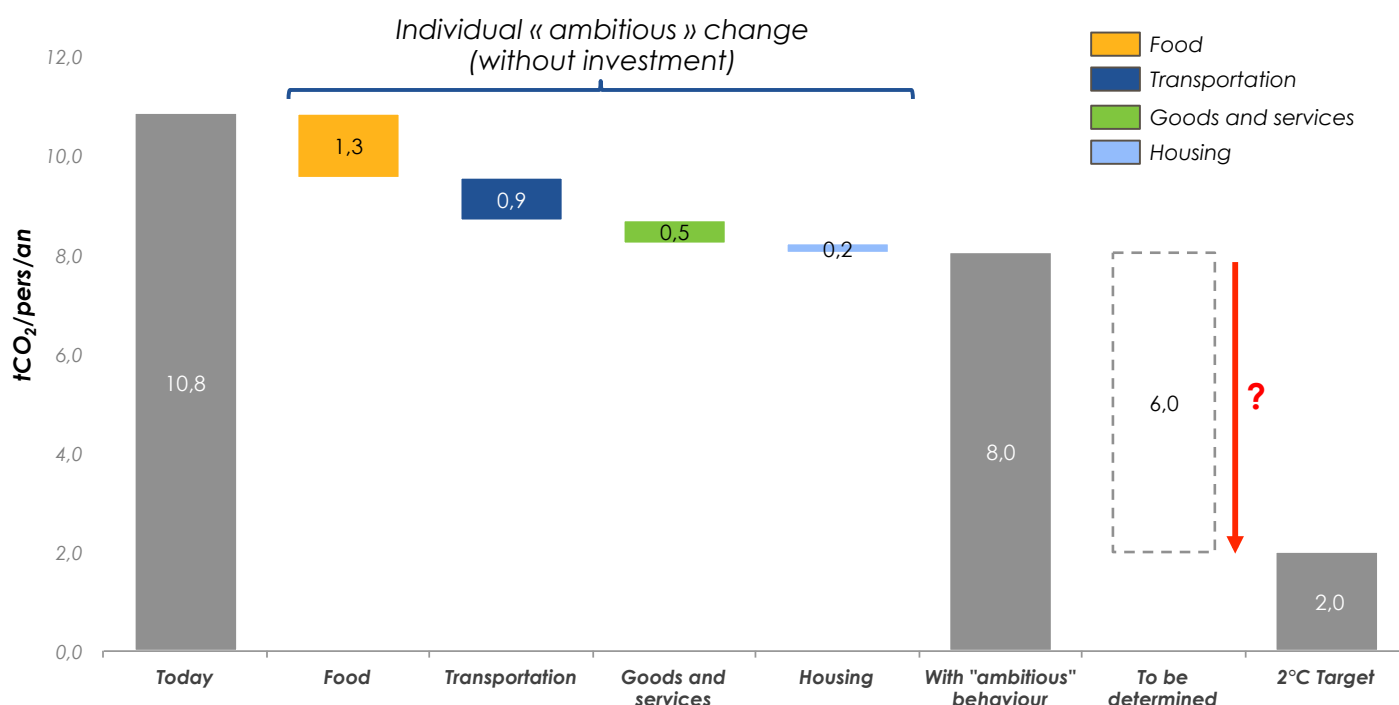


The **second conclusion** is that, **even with ambitious individual behavior**, in other words, activating all these initiatives on a daily basis and without any concession, **French citizens cannot reduce their footprint by more than 2.8 tonnes a year, or around 25% of the yearly carbon footprint.**

Keeping in mind that the reduction necessary to achieve suitable levels for a 2°C scenario is around -9 tonnes per year, per person (from 10.8 tCO₂/year to 2 tCO₂/year), **individual action could therefore only contribute to a maximum of a little less than a third of the effort that is needed** in order to achieve the objectives established by the Paris Agreement.

Individual actions, while necessary and significant, cannot achieve the -80% decrease in an individual's carbon footprint that is needed to meet the Paris Agreement's objectives on their own.

Maximal impact of individual actions Without actions requiring financial investment tCO₂



FROM THE 'AMBITIOUS' FRENCH CITIZEN TO THE 'AVERAGE' FRENCH CITIZEN

The conclusion is even more modest if we remember that this logic applies to all French citizens: **the result is only possible if the whole French population manages to put in this amount of effort.**

Yet, in France, one could conclude that **only 20% of individuals are a “driving force” on the climate issues**, 60% are rather “divided” on the issue, and 20% are outright resistant to all commitment to change when it comes to environmental and climate issues¹.

Supposing that the driving force individuals apply the actions essential to the “ambitious” behavior mentioned above (which will probably not even be the case), the variable individuals manage a quarter of the actions, and the resistant individuals will not do anything, the impact we could expect from voluntary changes to individual behavior (without regulation, prohibiting or obligation on behalf of the legislator) would be a reduction in the personal carbon footprint of around 5% to 10% for the average French citizen. A drop in the ocean compared with the 80% necessary.

The best impact we can expect from voluntary changes in individual behavior, taking into consideration the acceptability regarding climate change issues in society, would be a reduction in the personal carbon footprint of around 5% or 10% on average.

So, have we already lost the fight for the climate?

How do we maintain hope when even general asceticism could not reduce our carbon footprint by a quarter?

No matter how it looks, the relatively modest impact of individual action could actually be great news for all of us. Since it is an opportunity to realise that individuals remain dependent, no matter what they do, on carbon-intensive and energy-intensive processes, and that the crucial part of the battle to reach a higher level of ambition should be fought together, and not each one of us alone.

¹ EpE ZEN 2050 Study - Imagining and constructing a carbon-neutral France (In French: *Imaginer et construire une France neutre en carbone*)

SOCIO-TECHNICAL SYSTEM RESTRICTIONS

WHY ARE OUR INDIVIDUAL ACTIONS HAVING SUCH A SMALL IMPACT ON OUR PERSONAL CARBON FOOTPRINT?

The most straightforward answer is that the **climate issue is a systemic problem: it goes far beyond the private sphere**. We are all limited by the "system", in other words the social and technical environment that we have inherited, which is built on the promise of cheap and unlimited fossil fuels. Our equipment is energy-intensive and produces large quantities of CO₂. Austerity is necessary, but it must not be the only action that we take.

EXAMPLE OF TRANSPORT

Using more **public transport** and having more systematic access to **car sharing** are practices that have an undeniable impact on all emissions linked to our travel (around -1/3 in the field of transport). Nevertheless, whether we like it or not, these actions will not get rid of our dependence on a transport system that runs on carbon-based fuels like diesel, petrol, kerosene or NGV. And in many countries (not the case in France), electrification does not fix the problem, because people use coal and gas to fuel power plants instead of using the petrol directly. **Without seriously changing the equipment we use, it will be impossible to achieve a significant decrease in the overall carbon footprint.**

Likewise, car sharing makes it possible to reduce the carbon consumption per person transported, but it does not make it possible to cancel out the near total dependence on petrol or diesel transport.

Moreover, what should we do when there are no public transport alternatives for doing my commute by car and it is too far to even consider cycling? Or when where I live has an urban fabric that was based on an all-cars model, which leaves me totally dependent on the car, i.e. fossil fuels?

We are limited by the "system", in other words the social and technical environment we have inherited, built on the promise of cheap and unlimited fossil fuels.

EXAMPLE OF HOUSING

The same goes for emissions linked to **housing**. Installing a thermostat at home, or turning the thermostat down in winter in exchange for a jumper, are both extremely useful and cost-effective actions, that everyone can do in their own home.

However, as long as people do not invest in individual boilers, they will continue to run on gas or fuel. As long as corporations do not invest in a connection to an urban heating network (presuming that this is technically even possible), individuals will remain dependent of the building's heating solution or the gas network. Plus, each individual's action will not make a difference as to whether biomethane gas will be running through the gas network tomorrow or not, assuming that this is even possible.

An individual's personal change in behavior will not necessarily make homes more insulated. It is also unlikely to make a difference in the choice of carbon-intensive materials (concrete, steel) used to construct the building.

AN ENERGY-INTENSIVE SOCIO-TECHNICAL SYSTEM

A substantial part of our emissions are determined by the socio-technical system that we are a part of; it is the machines that emit the CO₂, not human beings.

In addition, austerity is necessary but it is also not enough. Increase efficiency and technology will not be enough any more. In order to change the situation, we need to replace our high-emission "energy slaves" with alternatives that are less carbon-intensive.

The country's equipment and infrastructure - or absence thereof - are the result of previous political choices: they are energy-intensive "in themselves", and due to circumstances, individuals do not have any control over the choices that are made for them from the past. However, the pursuit of these choices represents a collective will.

In order to win this battle, we need to look beyond the individual level to reach a new level of collective action. As well as individual efforts, which need to take place anyway, it is also crucial that we think about "eco-actions", these can take place through collective involvement; for example by citizens, employees, association members, or through any other kind of commitments. It is all about triggering a radical and deep system change in which of we are evolving within.

In order to achieve what is left in reducing emissions, it is up to the State and companies to invest massively in a huge transformation of the socio-technical system.

A BATTLE WE SHOULD FIGHT TOGETHER

The battle cannot be won purely through individuals acting alone. The State, local communities, companies and households have to join forces for an extensive decarbonization of the system that we depend on.

HOUSEHOLD INVESTMENTS, A MAJOR MEANS OF ACTION

Household investments in emission reduction projects are a natural extension of “small daily actions” (i.e. “unilateral changes in the behavior of individuals without the need for investments”) and can give households even more ambition, **providing that public authorities offer the necessary incentives and subsidies.**

We have distinguished two major types of “household investments”:

- **housing:** building renovation + boiler;
- **transportation:** buying a low-carbon private vehicle.

HOUSEHOLD INVESTMENTS-ACCOMODATION

Under our assumptions, **renovation should consist of upgrading one's building to performance level B¹.** Furthermore, replacing a boiler involves looking for low-carbon energy sources which are adapted depending on the type of accommodation.

The following assumptions apply to boiler replacement:

For private houses:

- replacing gas or electric panel heaters with heat pumps with a back-up system using gas
- replacing heating oil and coal with heat pumps, wood and LPG

For collective housing with individual heating:

- switch to installations largely “forced” to use gas boilers (it is difficult to install a heat pump in one's apartment without doing more substantial work)
- giving up on heating oil, partially switching to electricity (air-to-water and air-to-air heat pumps, panel heaters)

For collective housing with collective heating:

- replacing fossil fuels with access to the urban heating networks, communal heat pumps and communal wood-fuel boilers

¹ A level B EEL label corresponds with a primary energy consumption of 51 to 90 kWh/m²/year

HOUSEHOLD INVESTMENTS-TRANSPORT

The action of "buying a low-carbon vehicle" consists mainly of **replacing a combustion vehicle with an electric vehicle**¹. Although, within this research, some purchases of LPG vehicles and rechargeable hybrid vehicles were also taken into account.

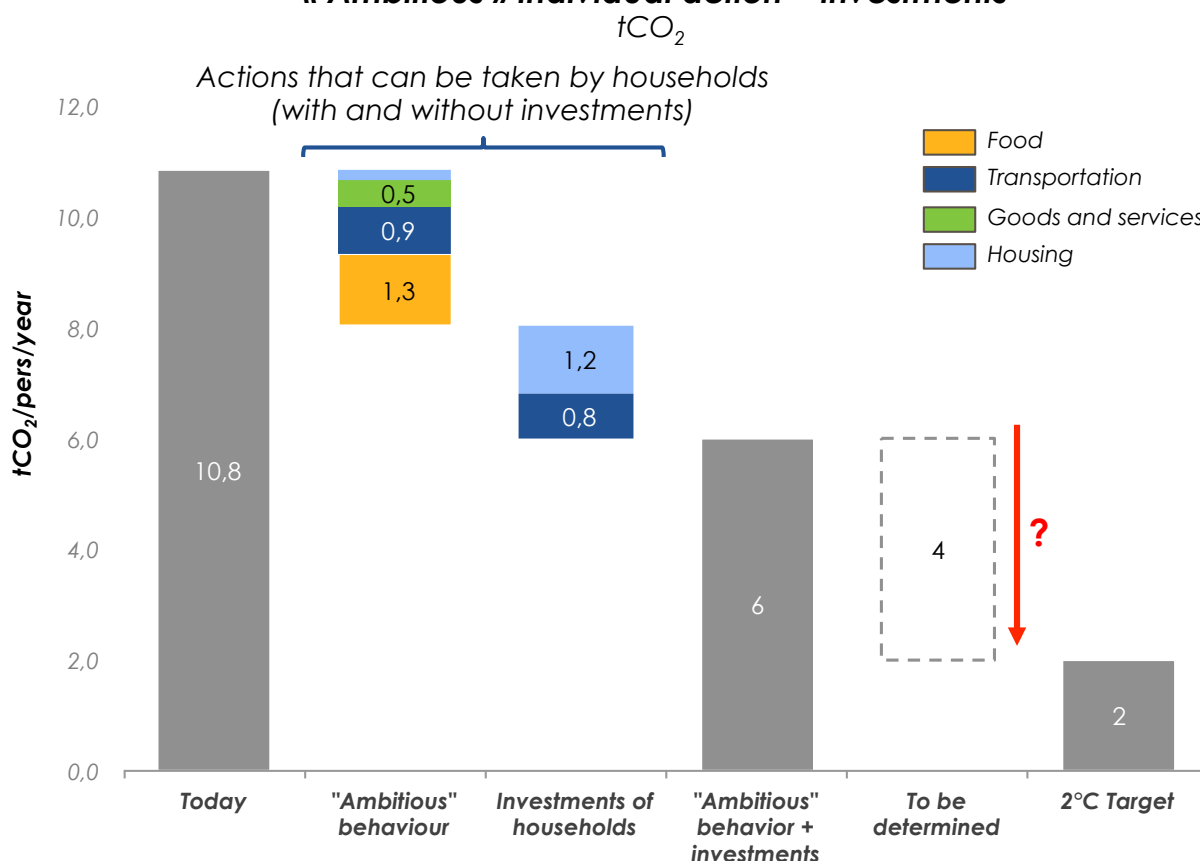
The combination of these two actions leads to a **reduction of approximately 2 tonnes of CO₂e per person per year**: 1.2 tonnes for the action of renovation plus boiler replacement and 0.8 for switching to a low-carbon vehicle.

In total, the combination of "ambitious" behavior and all relevant investments at an individual level leads to a 45% reduction of the carbon footprint, i.e. slightly more than half of the effort required to obtain the 2°C objective.



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Maximal impact of individual actions « Ambitious » individual action + investments



¹Assumption: 80% electric vehicles; 10% NGV vehicles; 10% rechargeable hybrid vehicles

THE URGENT NEED FOR MASSIVE INVESTMENTS BY THE STATE AND COMPANIES IN ORDER TO TRANSFORM THE SOCIO-TECHNICAL SYSTEM

The conclusion to be drawn from the above is irrevocable: **individual actions**, whether they are behavioral changes or household investments, **are both inevitable and yet insufficient**.

Inevitable, because we are the only ones who can carry them out. Behavioral changes (a -25% decrease for a very committed citizen) and actions requiring an investment (-20% at best for the listed actions) account for slightly less than 50% of our carbon footprint. That is substantial: it represents more than half of the effort required to achieve the 2°C objective. For an average citizen, not necessarily ambitious, the impact of personal actions without any investments would mean a reduction of approximately 20% (roughly 1/4 of the effort), which is still significant.

Insufficient, because the other half of the reduction effort is in the hands of other key actors in our socio-technical environment, notably public authorities and companies. Indirectly, this part of the effort is even bigger, because a large chunk of the household emission reduction, the part which requires investments, cannot take place without adequate public tools and incentives.

Companies and the State have an immense responsibility when it comes to the much needed change in the paradigm.

COMPANIES: DECARBONIZING THE VALUE CHAINS

The transition of the socio-technical system we live in will have to be partially brought about by the private sector.

We are all consumers of **goods and services**, imported or not, that have a carbon footprint reflecting the industrial, logistic and technical processes used to create them.

If these processes are not massively turned around, it is in vain to hope for a large-scale transition.

In order to decarbonize the value chain, the first step is for companies to perform an **exhaustive analysis of their carbon dependency** up and down the value chain, by the means of a carbon assessment.

Once this impact is understood, the next step is to insure a thorough **decarbonization of their industrial processes**, their freight, employee transportation, energy supply strategy, purchasing policy for tangible and intangible assets, clients' use of their products and services, the carbon intensity of their investments and the capacity of their solutions to be duly recycled or given a second life.

In such contexts, a policy of "small steps" simply will not do; incorporating the climate issue into the heart of their strategies, as described by the TCFD¹ report, is the only way for companies to provide themselves with the necessary guidance which can help them tackle the various challenges. Furthermore, private actors hold a responsibility because of their ability **to question their growth models and to integrate climate decisions at the highest level.**

This illustrates the importance of investments, both within research and development activities which are in search of products compatible with a low-carbon world; particularly those directed towards changes in equipment and processes.



In such contexts, a policy of "small steps" just won't do; incorporating the climate issue into the heart of their strategies is the only way for companies to provide themselves with the necessary reading grid to deliver on challenges.

THE STATE, A CRUCIAL CATALYST

Public authorities have a responsibility to contribute to **the decarbonization of the French socio-technical system** on various levels.

First of all, it needs to take place within the public institutions; by investing in the renovation of their own buildings and the decarbonization of their services (health, education, defence, domestic affairs, social housing, etc.). On the other hand, civil servants need to be trained in the subjects of energy and climate. Furthermore, the state **has a role to play in the decarbonization of companies and households**, as a macro-economic agent as well as a regulator. Public authorities possess a "Swiss Army knife" allowing them to redirect investments into low-carbon sectors at the expense of brown assets, develop adequate public incentives, regulate and adapt taxes, and renegotiate certain commercial agreements.

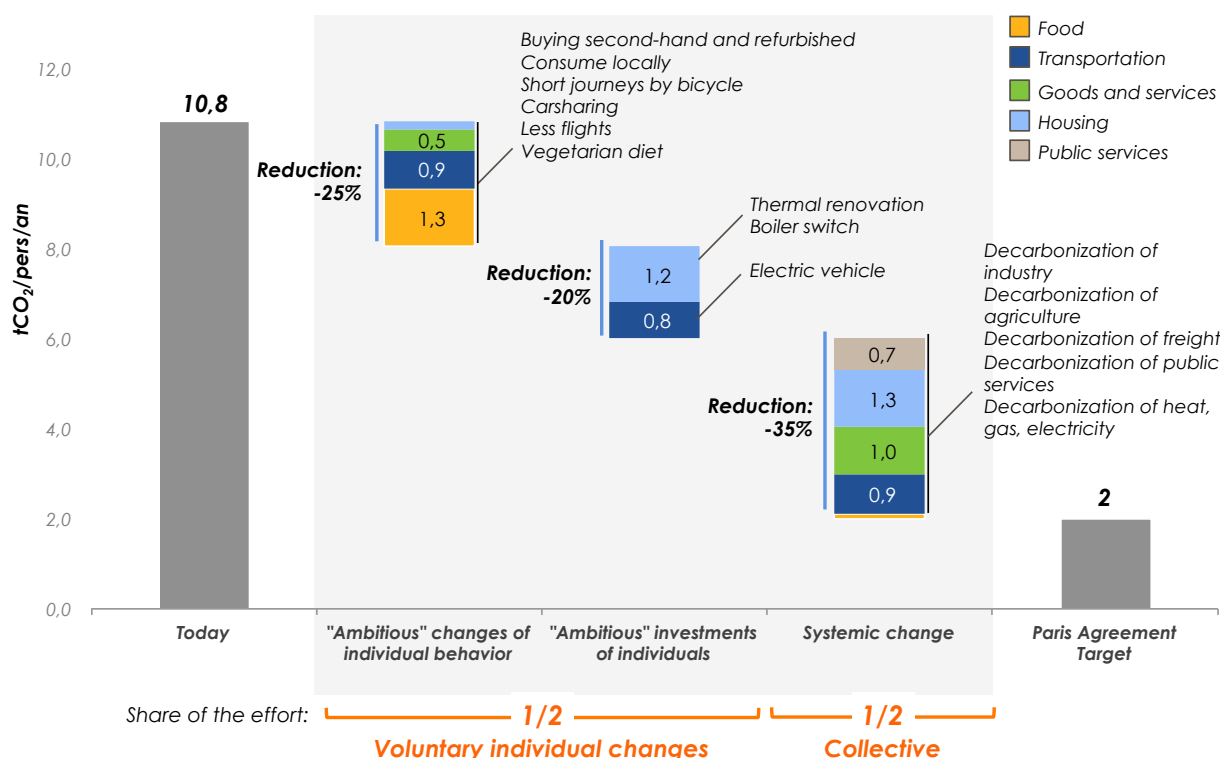
This power should help to drive the decarbonization of the country through measures including, but not limited to:

- the development of low-carbon energy sources that have a good potential to contribute to the achievement of the national objectives; yet at the same time, offer the best perspective in terms of contributing to the commercial balance and the cost of tonnes of CO₂ being avoided;
- big renovation projects for residential and tertiary sector buildings;
- the decarbonization of the transportation of people and goods;
- incentives and support for the transition of the agricultural and industrial system;
- increased number of natural and technological carbon sinks;
- ...

SUMMARY – "AMBITIOUS" HOUSEHOLDS

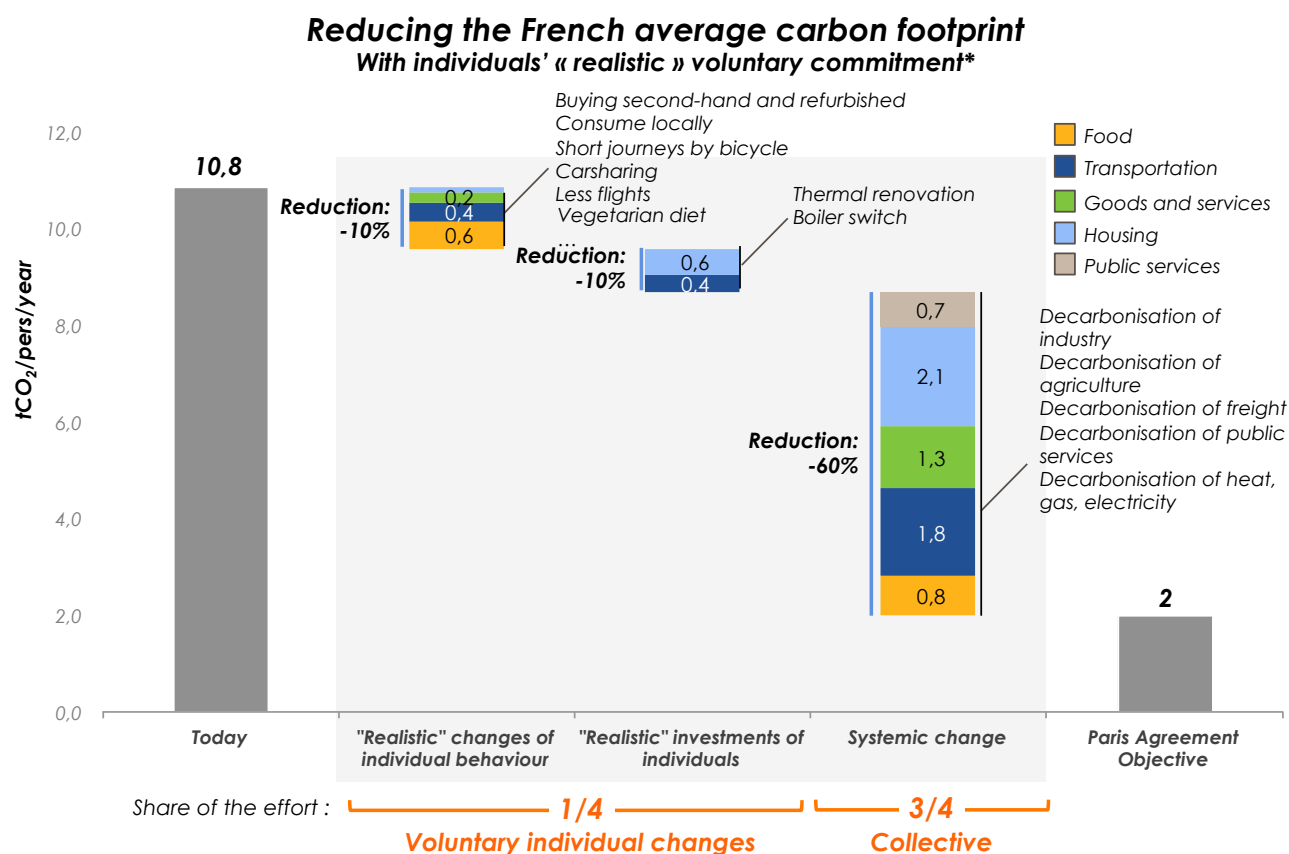
Overall, the "system" has a huge responsibility when it comes to the effort required to reduce the carbon footprint of French citizens to the level set by the Paris Agreement. Even if all the French were model citizens, the system should still assume half of the effort.

Reducing the French average carbon footprint With individual's « ambitious » voluntary commitment



SUMMARY – "AVERAGE HOUSEHOLDS"

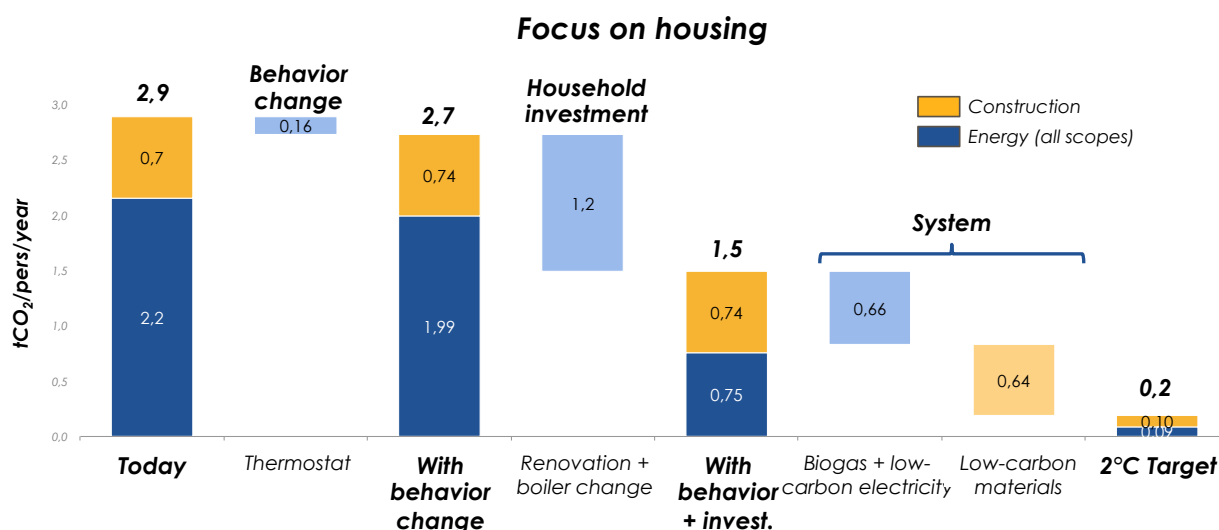
In the most realistic case of a moderate acceptance of behavioral change at an individual level, public authorities and companies are responsible for approximately three quarters of the effort.



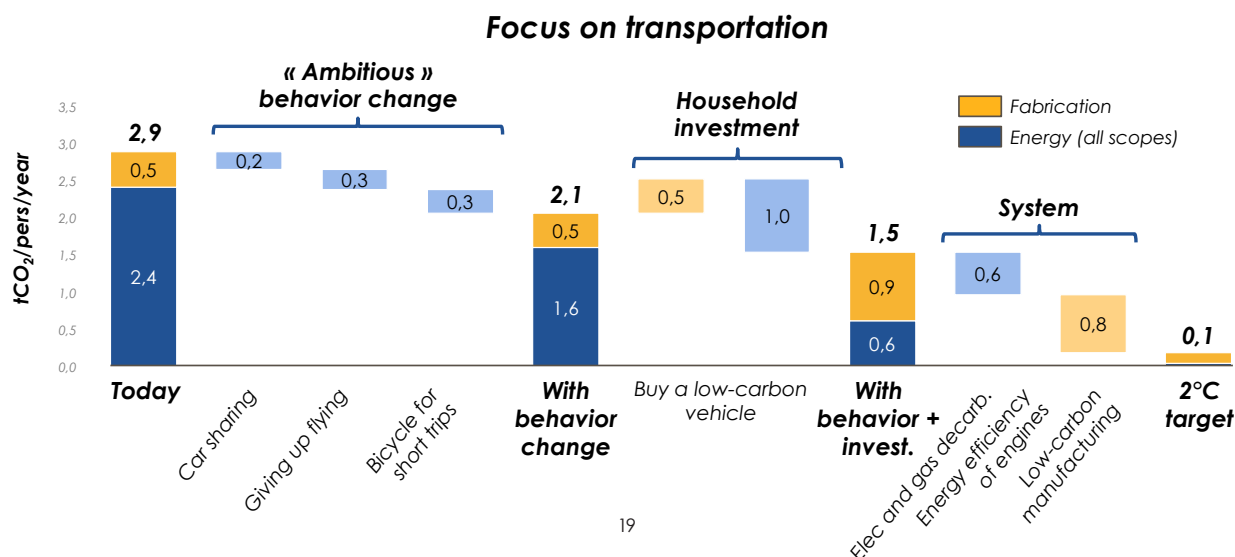
* The "realistic" vision believes that only a part of the potential individual efforts will actually be achieved, depending on the desire of French households to change on a national scale. It is therefore more modest than the "ambitious" vision, where all households take all action possible (a decrease of -25% in this case).

FOCUS ON HOUSING AND TRANSPORT

When we take a closer look at what happens in **the “housing” area**, we see that the carbon footprint can already be halved through household actions with or without investments. On the one hand, the rest of the reduction will have to be achieved through the reduction of the emission factors of electricity (the development of the renewable and low-carbon sector) and gas (the development of the biomethane sector); on the other hand, through the reduction of the carbon content in the materials which are used in housing construction (bio-sourced materials, replacing the clinker in cement, less use of concrete, etc.).



The next area which could have a **significant impact** is **transport**, this includes: car sharing, using a bicycle instead of a car in urban areas and drastically reducing the number of flights an individual takes. It should be noted that **the relatively weak impact of banning flights is due to the fact that we are looking at the “average carbon footprint” and therefore the socioeconomic reality is not taken into account** (flights are not an issue for modest households, but an important factor for wealthier households, which are frequently travelling to remote destinations). Additionally, investing in an electric vehicle is a double-edged sword, as half of the significant gain which occurs in the usage stage (-1 tonne/year), is then undone by the increased footprint of the battery production (+0.5 tonnes/year). The transition to net zero-emissions transport, as recommended by the National Low-Carbon Strategy, will only be possible with a near-complete decarbonisation of electricity and gas systems, as well as a considerable reduction of the carbon content of batteries and other equipment.



CONCLUSION

Let us recall **the immense value of “daily actions” and behavioral changes, for at least two reasons.**

First of all, they have an **undeniable effect on the reduction of the carbon footprint**; provided that they tackle the challenges and do not serve as a moral justification to excuse other more objectionable consumption patterns. Let us keep in mind, that if we are willing, **we can reduce our personal footprint by approximately a quarter. This is simply based on simple changes in behavior and consumption patterns**, which is substantial.

Secondly, they are **necessary**, in the strictest sense of the word, because **we are the only ones who can carry them out**. No one will opt for more energy-efficient and less carbon-intensive consumption patterns and behavior on our behalf. Personal choices that can only be made by ourselves, include: trading the car for a bike as often as possible, car sharing, eating less meat and reducing our consumption of new goods; these need to be carried out often in combination with other value systems. Climate action - and that's what makes it such an inspiring and exciting project – has to be led with other ambitions, which can bring well-being and resilience.

Nevertheless, **these much needed actions on an individual scale must be matched by a strong collective commitment**. The figures make it clear: individuals will not be able to tackle all of these issues on their own. If the socio-technical system we live in is not urgently reformed, **it will not be possible to keep up the permanent call for individual action much longer**.

Therefore, the responsibility of the public authorities and companies to reduce the personal carbon footprint of French citizens is tremendous.

In order to win this battle, we need to transcend the individual level and start taking collective action. As well as individual efforts, which need to take place any way, ecological actions through collective involvement are essential to bring about a radical and deep change to the system in which we evolve.

The massive and global transition towards a low-carbon society must involve the mobilization of all citizens, with each and every one contributing as much as they can. **This will involve delegating responsibilities without laying blame, demanding a radical transformation of the system without abandoning one's individual efforts and finally combining the ecological evolution of one's personal behavior with collective action in the public sphere.**

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